various vertebrates, explanation of the premature birth of the opossum, the main outlines of the history of the mammary glands and placenta and a number of other items.

It was published and appeared as a separate work, because it was felt that the facts described were sufficiently novel and important to warrant such a course, and not merely 'to secure attention' to my theory. The 'note of personal exultation' is no such theory; it is intended to be an invitation and challenge to scientific men to examine and, if possible, to refute my arguments. The latter is something the reviewer has carefully avoided to attempt.

The last paragraph cited (5) is merely the expression of the critic's personal opinion and, unless supported by argument, can carry no conviction. The reviewer offers no reasons for his adverse judgment; until he does so, it is out of question to consider, or even to understand, what standpoint he takes up. A mere denial of the truth of my theory is not argument, but dogmatism.

J. BEARD.

UNIVERSITY OF EDINBURGH.

MR. BEARD'S paper on the transient nervous system was well known to me, and I consider my statements correct, and I made them deliberately. There are two methods, and only two, that enable the investigator to trace the forms and connections of nerve-cells, the Golgi method and the methylen-blue method. Mr. Beard employed neither of these, and, as a matter of fact, has not traced, and was necessarily unable to follow, all the essential transformations of these cells. His research is an extremely interesting one, and, in my opinion, important, but the results are not available in support of the 'Phorozoon' theory. The number of embryos and of years devoted to the research do not make up for the exclusive use of an insufficient method.

The facts referring to the condition of the organs at the 'critical stage' are given more or less fully in all embryological text-books. The occurrence of the critical stage is not specially mentioned, because no embryologist, except Beard, has heretofore regarded it as more or less important than preceding and subsequent stages. The error of Mr. Beard's, which I note, is the assumption that this stage is 'critical,' for stages before it and after it could equally well be selected and traced through the vertebrate series as accurately as the 'critical' stage. If Mr. Beard knows the contrary of this he must have compiled the characters of various classes of vertebrates at other stages and found that they do not agree. The detailed publication of such a compilation must precede a claim for serious attention to his hypothesis. As stated in the notice of Beard's work, the compilation of characteristics in vertebrate embryos of various classes and all approximately at the same stage is useful, and if corresponding tables of other stages were also compiled they would also be useful. It would be interesting to know what proof establishes the 'critical' nature of the stage selected by Mr. Beard. He has not as yet published any such proof, although the *onus probandi* is his. He calls for disproof, but proof from him must come first. Mr. Beard states that he compiled the facts, yet complains that I say the facts are well known. Does he mean that the facts he quotes from various authors were unknown? My review is a protest against two tendencies: first, to solve, embryologically, morphological problems without sufficient regard to histogenesis; second, to push speculation indefinitely beyond observation. Both tendencies have been marked in Mr. Beard's previous papers, as well as in the one under discussion.

I regret that my criticism cannot be more favorable.

CHARLES S. MINOT.

SCIENTIFIC LITERATURE.

The Survival of the Unlike. A collection of Evolution Essays suggested by the study of domestic plants. By L. H. BAILEY. New York, The Macmillan Company. 1896. 515 pp. 8vo.

Whatever Professor Bailey writes is interesting reading. He has the rare gift of an entertaining style, and what he writes people want to read. All his previous books have been widely read, and this will prove to be no exception to the well-established rule. The secret of this popularity, if there be any secret about it, is that when he writes he has some-

thing new to say, something based upon experiences and observations. These are by no means all his own, for he has the ability to see with the eyes of other people, as well as with his own. He is thus able to bring into his pages a rich mass of new matter which gives them additional interest and value.

This new book consists of essays and papers, all of which have been presented elsewhere and are now brought together in accordance with the author's plan. Thus, while a collection of essays, it is not without unity. "In making these essays," the author says in his preface, "I have constantly had in mind their collection and publication, and have therefore endeavored to discuss the leading problems associated with the variation and evolution of cultivated plants, in order that the final collection should be somewhat consecutive."

The following sentences from the preface will give the reader a general idea of the author's position. "The underlying motive of the collection is the emphasis which is placed upon unlikenesses, and of their survival because they are unlike. The author also denies the common assumption that organic matter was originally endowed with the power of reproducing all its corporeal attributes, or that, in the constitution of things, like produces like. He conceives that heredity is an acquired force, and that, normally or originally, unlike produces unlike." The author's *a priori* reasons for belief in the hypothesis of evolution are "the two facts that there must be struggle for existence from the mere mathematics of propagation, and that there have been mighty changes in the physical character of the earth, which argue that organisms must either have changed or perished." On the other hand, "the chief demonstrative reason for belief in evolution is the fact that plants and animals can be and are modified profoundly by the care of man."

The body of the book is in three 'parts,' the first including essays touching the general fact and philosophy of evolution; second, those expounding the fact and causes of variation, and third, those tracing the evolution of particular types of plants. The first essay gives name to the book. In it the author discusses (1) the nature of the divergences of plants and animals, suggesting the *Mycetozoa* as the point of divergence; (2) the origin of differences, holding that all plants and animals came from one original life-plasma which had the power of perpetuating its physiological but not its structural identity; no two organisms ever being exactly alike, it follows that unlike produces unlike; (3) the survival of the unlike, this being an extension of our notion of the meaning of the phrase 'the survival of the fittest,' by showing that the fittest are the unlike.

The author gives us some interesting pages on the species dogma, in which he pointedly shows the inconsistency of those who demand experimental evidence of the evolution of a species, and yet reject 'horticultural species' because they have been produced under cultivation. Many examples are given of the origination of well-marked 'varieties,' which are more different from the species from which they sprung than are the recognized species from one another. Here Professor Bailey's experience as a horticulturist enables him to cite striking examples of what the candid reader must admit are good species evolved through man's selection. Thus we seem to have made species of of beans (*Phaseolus*), tomato (*Lycopersicum*), maize (*Zea*), soy-beans (*Glycine*), etc. The horticulturist who is familiar with the plasticity of plants, and who is accustomed to see new and persistent forms arise, cannot help being an evolutionist, nor can he help being impatient with the botanist who refuses to accept such forms as true varieties or species, as much entitled to recognition as those whose origin we do not happen to know.

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A Popular Handbook of the Ornithology of Eastern North America. By Thomas Nuttall. 2d Revised and Annotated Edition, by Montague Chamberlain. With additions and 110 illustrations in colors. Vol. I., The Land Birds. Vol. II., Game and Water Birds. Boston, Little, Brown & Company. October, 1896.

For more than half a century students of North American ornithology have had three works which by common consent came to be